In the *Monthly Notices* of the Royal Society of Tasmania for 1874 occur some interesting abstracts of papers read before the Society, including notices of the Angora goat, some species of Tasmanian birds, introduction of the salmon into Tasmanian waters, the Silurian fossils of Tasmania, the Tertiary basin of Launceston, and a list of the plants of Tasmania, prepared in 1875 by Baron Fred. von Mueller. To the notices are appended the meteorological observations made during the year by Mr. F. Abbott at Hobart Town, and by Mr. W. E. Shoobridge at New Norfolk. From the monthly notes we observe that meteorological observations are also made at Port Arthur, Mount Nelson, King's Island, and other places, and sent to the Society, but the results are not published, nor so far as we are aware have they been published since 1866. We hope the Society may soon be in a position not only to publish these results, but also results from a sufficient number of stations, so as to represent adequately the meteorology of the island.

THE additions to the Zoological Society's Gardens during the past week include a Cariama (*Cariama cristata*) from South-east Brazil, presented by Capt. W. C. Chapman, H.M.S. *Dido*; two Black-eared Marmosets (*Hepale penicillata*) from Brazil, presented by Mr. G. Newton; a Rose-ringed Parakeet (*Palæornis docilis*) from West Africa, presented by Mrs. Haywood; a Hyacinthine Maccaw (*Ara hyacinthina*) from Brazil, presented by Mr. H. Wilson; a Moor Monkey (*Semnopithecus maurus*) from Java, a Bay Antelope (*Cephalophus dorsalis*) from West Africa, purchased; two Vulturine Guinea Fowl (*Numida vulturina*) from East Africa, a Puma (*Felis concolor*) from Central America, deposited.

SCIENTIFIC SERIALS

Poggendorff's Annalen der Physik und Chemie, No. 3.—According to the kinetic theory of gases, supposing the gaseous molecule to consist of only one atom, the relation of the two specific heats (as Clausius has shown), would be 1·666. The lower number obtained by experiment for several gases may probably be explained by the complex constitution of their molecules. It seemed desirable to MM. Kundt and Warburg to determine experimentally the specific heat of mercury vapour, which has been considered by chemists to consist of monatomic molecules. Their method was to produce a sound in two glass tubes placed end to end, and containing, the one mercury vapour, the other air. Having introduced powder into the tubes, they observed the distances between the nodes of vibration. Applying a formula of acoustics which comprehends, among other things, the densities, the temperatures, and the relation of the specific heats, and taking, as value of this relation in the case of air, the number 1·405, they obtain, for mercury vapour, the number 1·67, which may be considered as fully in accord with the number 1·666 furnished by theory.—In an interesting paper which follows, M. Colley, of Moscow, examines a particular case of work done by the galvanic current. Suppose a current to pass through a vertical column of some salt, *e.g.* nitrate of silver; both electrodes being in this case of silver. In a given time a certain quantity of silver is liberated and deposited. Now, if the current pass up the column, it lifts this silver against the force of gravity, and so does mechanical work, which, in the opposite case (of the current passing down) is not done. It appeared, then, as theory anticipated, that the downward current in such a column (as measured by the galvanometer), was stronger than the upward, and the difference was not greater than theory indicated. But both with a battery current and with that from a Clarke magneto-electric machine, it was considerably less. The author, seeking an explanation, regards as untenable the general views regarding passage of currents through liquid conductors, the phenomena of passage from the solid to the liquid conductor being generally ignored; and he thinks the facts favour Helmholtz's view, which regards the liquid, with the electrodes immersed in it, as a condenser of very great capacity. Weak currents which cannot pass through the liquid yet produce a polarisation of the electrodes (charge of the condenser). With strong currents the only difference is that as soon as the difference of tension has reached a certain limit (maximum of the electromotive force of polarisation), all newly arriving quantities of electricity can unite through the liquid. M. Colley shows how his results are deducible from the state of things thus supposed.—A number of experiments on electric clocks (with Tiede's pendulum) are described by Dr. Joseph Brunn.—Of the few remaining original papers we note one by M. Chwolson on the theory of interference-phenomena.—A good experiment for illustrating the explosive character of a mixture of oxygen and hydrogen gases is described by M. Rosenfeld.

Archives des Sciences Physiques et Naturelles, Jan. 15.—In the opening paper of this number M. de Candolle inquires into the causes of unequal distribution of rare plants on the Alpine chain (See NATURE, vol. xiii. p. 516).—M. Favre follows with a note on the glacial and post-glacial strata of the southern slope of the Alps, in the canton of Tessin and in Lombardy.—M. Pictet discusses the application of the mechanical theory of heat to the study of volatile liquids, and finds some simple relations between the latent heats, atomic weights, and tension of vapours.—A series of meteorological observations from the coast of Labrador, by Moravian missionaries, is communicated by M. Gautier (See NATURE, vol. xiii., p. 60).

SOCIETIES AND ACADEMIES

LONDON

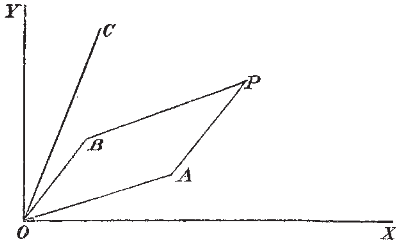
Royal Society, May 18.—"On the Organisation of the Fossil Plants of the Coal-measures.—Part VIII. Ferns continued, and Gymnospermous Stems and Seeds." By Prof. W. C. Williamson, F.R.S., Professor of Natural History, Owens College, Manchester.

The author described the stem of a new fern, in which the principal vascular axis formed a cylinder enclosing a medulla, as in some Lepidodendra. This vascular cylinder gives off secondary bundles, to petioles, and rootlets, and each vessel is filled with tylose. Two kinds of Fern-sporangia were described—one Polypodiaceous, with a straight, vertical annulus; the other, with the annulus horizontal and subterminal, exhibits a type seen in the recent Schizeaceæ and Gleicheniaceæ. But the chief subjects of the memoir are the stems and seeds of Gymnosperms. Of the former various modifications of the *Sternbergian Dadoxylons* are described, and shown to correspond very nearly to many recent conifers, though with distinctive features of their own, especially in the structure of their woody fibres, and in the leaf-bundles of some species being given off in pairs. The author still excludes the Sigillariæ from the Gymnospermous group.

The most important novelties are the Gymnospermous seeds, exhibiting their internal organisation, found in France by M. Grand-Eury, and by the author in this country. Of these he describes a number of new genera and species in addition to the Trigonocarpons previously described by Mr. Binney and Dr. Hooker. The most remarkable of these is one designated *Lagenostoma ovoides*, in which a large flask-shaped cavity, inclosed within a crenulated canopy, occupies the apical end of the seed, between the apex of the endosperm and the exostome. Brongniart believed, with reason, that such cavities have originated in the absorption of the apex of the nucleus, leaving the corresponding part of the nucular membrane to form the cavity or "lagenostome." In this lagenostome large pollen-grains are found in many cases. Brongniart designates it the "Cavité pollinique." Examples of several other seeds presenting generic and specific modifications of the same type, as well as several species of the well-known genus Cardiocarpum and of Trigonocarpum. In all these the primary nucleus seems to have been absorbed, being now only represented by the investing nucular membrane. Within this is an inner structureless bag, which, in some of the Cardiocarpa, is filled with parenchyma, and which appears to represent the *secondary* perispermic membrane, or what is really the endospermic membrane, or *primary* embryosac of the Gymnosperms. The intimate structure of Trigonocarpum agrees with Dr. Hooker's description of it so far as the longitudinal sections are concerned, save that here, also, a "cavité pollinique" exists. Transverse sections show that the well-known sandstone casts of Trigonocarpum do not represent the external form of these fruits, but are *casts of the interior* of the hard endotesta. This latter was not trigonous externally, like the common specimens, but had twelve longitudinal ridges, three of which, corresponding with those of the sandstone casts, were more prominent than the rest. The endotesta was invested by a delicate parenchymatous sarcotesta. All these seeds appear to have Cycadean rather than Coniferous affinities. One winged seed alone (Polypterospermum), from the uppermost coal-measures at Ardwick, resembles a true conifer. In conclusion, the author calls attention to the number of yet unknown stems and leaves of Phanerogams, which must have belonged to the numerous seeds now known to exist in the coal-measures of England, France, and North America.

Mathematical Society, June 8.—Prof. H. J. Smith, F.R.S., president, in the chair.—Mr. A. B. Kempe spoke on a general method of describing plane curves of the *n*th degree by link-work. He first described what he calls the *reversor* and the *multiplicator*. (These were first described by him in the "Messenger of Mathematics," vol. iv. pp. 122–3, in a paper "On some New Linkages.") He then explained the *additor* and the *translator*. Let $\phi(x, y) = 0$ be the equation to any plane curve of the *n*th degree, and let P be any point on the curve; construct the link-work parallelogram $OAPB$ in which

$$OA = BP = a, \quad OB = AP = b,$$



and let the angle $A\,o\,X = \theta$, and the angle $B\,o\,X = \phi$, then—

$$x = a \cos \theta + b \cos \phi$$

$$y = a \cos\left(\theta - \frac{\pi}{2}\right) + b \cos\left(\phi - \frac{\pi}{2}\right)$$

Substitute these values of x and y in $\phi(x, y)$, expand and convert powers of cosines into cosines of multiple angles, and then the products of cosines into the cosines of the sums and differences of angles, we shall then get—

$$\phi(x, y) = \Sigma\,[A \cos(r\phi \pm S\theta \pm a)] + C,$$

where r, s are positive integers, and $a = \frac{\pi}{2}$ or 0 and A and C are constants. The author then proceeded to show how the constructions could be effected by his link-work, and he pointed out that his method would not be practically useful on account of the complexity of the link-work employed, a necessary consequence of the perfect generality of the demonstration. The method has, however, an interest as showing that there *is* a way of drawing any given case; and the variety of methods of expressing particular functions that have already been discovered renders it in the highest degree probable that in every case a simple method can be found. There is still, therefore, a wide field open to the artist to discover the simplest link-works that will describe particular curves. Mr. Kempe further pointed out that the extension of the demonstration to curves of double curvature and surfaces clearly involves no difficulty.—Mr. S Roberts then gave an account of a further note on the motion of a plane under certain conditions. (The former paper was read June 8, 1871).—Mr. J. J. Walker communicated a method of reducing the equation of a nodal plane cubic curve to its canonical form, in which the lines of reference are the nodal tangents and axis of inflexion.—Prof. Cayley described a surface connected with the sinusoid. Its edge of regression was given by the equations $x = r \cos \phi$, $y = r \sin \phi$, and $z = r \cos 2\phi$.—The president made a few remarks in connection with a recent note by M. Hermite, on a theorem of Eisenstein's.

Zoological Society, June 6.—Dr. A. Günther, F.R.S., vice-president, in the chair.—The Secretary exhibited some specimens of a Land-crab, from Ascension Island (*Geocarcinus lagostoma*), which had been presented to the Society by Dr. J. B. Drew, and read a note by Dr. Drew on their habits.—Mr. Sclater exhibited skins of a male and female of the new Pheasant from Borneo lately described by Mr. Sharpe as *Lobiophasis bulweri*. These birds had been obtained alive for the Zoological Society of Amsterdam, but the female only had lived to reach Amsterdam.—A letter was read from Mr. J. H. Gurney, containing some notes on the breeding of a pair of the Polish Swan (*Cygnus immutabilis* of Yarrell), and a description of the young birds.—A communication was read from Dr. Julius von Haast, F.R.S., containing some notes on the skeleton of *Ziphius Novæ Zealandiæ*.—A second communication from Dr. Julius von Haast, F.R.S., contained some notes on *Mesoplodon floweri*.—A communication was read from Dr. G. E. Dobson, containing a description of certain peculiarities in the structure of *Mystacina tuberculata*, which induced him to believe that this Bat used its feet for purposes of locomotion on branches and leaves of trees.—Mr. A. H. Garrod read the first part of a memoir on certain anatomical characters which bear upon the major divisions of the Passerine Birds.—A communication was read from Mr. E. L. Layard, C.M.G., containing notes on the Birds of the Navigators and Friendly Islands, with some additions to the ornithology of Fiji.—Mr. H. Adams and Mr. G. French-Angas communicated descriptions of five new species of Land Shells from Madagascar, New Guinea, Central Australia, and the Solomon Islands.

Royal Microscopical Society, June 7.—Mr. H. J. Slack in the chair.—A number of presents to the society were announced, including some rich diatomaceous earth from Santa Monica, near Los Angelos, sent by Mr. Hanks, of San Francisco.—A paper on a photograph of Nobert's bands, by Count Castracane, was read to the meeting and was supplemented by a short communication upon the same by Mr. H. C. Sorby.—Mr. Henry Davis gave an interesting account of some new observations which he had made upon *Chonochilus volvox*, and illustrated his remarks by drawings showing the principal features of the genus as distinguished from the Melicertians.—Mr. Chas. Stewart described and exhibited under microscopes in the room some minute spines found only round the pentagonal opening on the under side of the shell of the Echinoderms; he also gave a description of the remarkable structure of the large lachrymal gland of the common turtle, and exhibited preparations.

Victoria Institute, May 29.—Annual Meeting.—The Right Hon. the Earl of Shaftesbury, K.G., in the chair. The address was delivered by the Rev. Prof. Birks, of Cambridge. 115 members and associates have joined during the year, and the total number has risen to 690, two-thirds of whom are country and foreign members. The president, on behalf of the Institute, presented a testimonial to Capt. F. Petrie, who had acted as honorary secretary and editor of the "Transactions" for the last five years and a half.

BERLIN

German Chemical Society, May 22.—C. Scheibler, vice-president, in the chair.—A. Fischer described a modified water air-pump, remarkable for its cheapness. The brass instrument is sold by Messrs. Dreyer and Rosenkranz in Hanover for ten shillings, or with a manometer fixed to it for twenty shillings. It can be fixed to any laboratory table.—A. Horstmann confirmed observations by F. Isambert respecting the dissociation of the combination of ammonia with chloride of silver. For every degree of temperature a certain pressure can be observed, at which the separated bodies do not re-combine and the combination ceases to be decomposed. He also observed the existence of two compounds of the formulæ $AgCl.3NH_3$ and $2AgCl.3NH_3$.—A. Steiner has obtained the following combination of sulphuretted hydrogen with fulminic acid by passing H_2S into fulminate of mercury—

$$C_2H_2N_2O_2 + H_2S = C(NO_2)H_2 - CS.NH_2,$$

microscopical crystals, yielding, with a surplus of sulphuretted hydrogen, oxalic acid, sulphocyanide of ammonium, and sulphur—

$$2(C_2H_4N_2O_2S) + H_2S = 2CN_2H_4S + C_2H_2O_4 + S.$$

The same chemist by treating fulminurate of ammonium with sulphuric acid has obtained nitro-acetonitrile, $CH_2NO_2.CN$ (hitherto unknown), beautiful colourless crystals, fusing at 40°, burning with a brilliant flame. The substance is not identical with fulminic acid, because with mercury and silver it forms monobasic and not dibasic salts. He also described two bodies formed by the reaction of ammonia on fulminate of mercury, of the formulæ $C_6H_{11}N_9O_3$ and $C_7H_{13}N_{11}O_3$, guanidines, containing fulmi-guanurates. At the end, double salts of fulminate of mercury with sulphocyanide of potassium and ammonium, and also with cyanide of potassium were described.—E. Demole published researches on a body lately described by Baumstark, C_4H_9IO, under the name of ethylidene-iodo-oxethyl. Mr. Demole's researches lead him to suppose that this body is derived from ethylene and not from ethylidene.—A.

Laubenheimer has found nitro-meta-chloro-nitrobenzol to exist in four modifications, chemically identical but differing in physical and crystallographical respects. The same chemist has transformed the above-named substance by boiling it with an alcoholic solution of potash into nitro-chloro-phenol and mono-chloro-chinone, $C_6H_3ClO_2$; and by treating it with aniline into chloro-nitro-diphenylamine, $C_6H_3Cl(NO_2) . NH . C_6H_5$. Nascent hydrogen transforms dinitrochlorobenzol into chlorinated phenylen-diamine.—L. Mears has studied the action of nitric acid on benzanilide, which yields three isomeric nitro-benzanilides.—W. Grethen has transformed acetanilide into ortho- and para-nitro-acetanilides, formed simultaneously.—C. Sennewald described meta-amido-benzanilide. The same chemist has transformed anhydro-benzoyl-diamidobenzol—

$$C_6H_4 . N . C . C_6H_5 . NH,$$

into the amylic substitution-compound—

$$C_6H_4 . N . C . C_6H_5 . N . C_5H_{11},$$

and into the corresponding ethyl-compound.—H. Hübner and F. Frerichs have studied the action of iodide of cyanogen on diamidobenzoles. The result is expressed by the equation—

$$2C_6H_4(NH_2)_2 + CNI = C_{13}H_{12}N_4 = \\ C_6H_4(NH_2)N - C - N(NH_2)C_6H_4.$$

—O. Hesse reported on the properties of a new alkaloid called cusconin.—Th. Cöllen described the action of sulphuric anhydride on para-chlorobenzoic acid, resulting in the formation of a mono-sulphonic acid, $C_6H_4Cl(COOH)(SO_3H)$.—C. Liebermann has observed the formation of rosolic acid when phenol is treated with chloroform and sulphuric acid. This explains the ordinary formation of rosolic acid by heating phenol with oxalic acid.

STOCKHOLM

Academy of Sciences, April 12.—Dr. G. Lindström of Wisby was chosen Intendent of the Palæontological department of the Riks Museum. The following papers were communicated:—On the amplitude of the daily variation of temperature in Sweden, by Herr Rubenson.—On the varieties of Diabase and Gabbro in Sweden, by Herr A. E. Törnebohm.—Recherches sur un nouveau genre des Holothuries, by Docent Hj. Theel.—Contributions to a monograph of the Amphipoda, I.—The family Oxycephalidæ Spence Bate, by Docent C. Bovallius (this paper is written in English).—The land and fresh-water mollusca of Siberia, I., by Dr. Westerlund.—On the Dannemora iron-ore field, by Engineer A. E. Fahlcrantz.—Notes on the vertebrate fauna of North Bohus län, by Herr C. Cederström.—Primæ linæ muscorum cognoscendorum, qui ad Caldas Brasiliæ sunt collecti, by J. Angström, M.D.—Herr Santesson was chosen president for the year now commenced. The retiring president, Herr Wœrn, gave an address on the manufacture of iron and steel in North America.

PARIS

Academy of Sciences, June 5.—Vice-Admiral Paris in the chair.—The following papers were read:—Astronomical researches (continued) by M. Le Verrier. He presented vol. xii. of the *Annales de l'Observatoire*, containing the tables of Jupiter and Saturn.—On the thermal formation of ozone, by M. Berthelot. He passed a current of oxygen through a tube, where it was acted on by the silent electric discharge, into a phial containing dilute arsenious acid. The transformation of the acid into arsenic acid was noted, and the heat liberated compared with that liberated in oxidation of arsenious acid by free oxygen. The heat liberated by change of ozone into ordinary oxygen is thus found to be + 14·8 cal., that is, − 14·8 in formation of ozone (or − 29·6 per atom). Ozone is thus a body formed with absorption of heat.—On the absorption of free nitrogen by organic matters at the ordinary temperature, by M. Berthelot. This occurs under influence of the silent discharge, and is well marked in the case of benzine; marsh-gas, acetylene, &c., also show it. Such phenomena must occur in thunder-storms, and have important physiological effects.—On the origin of organised ferments, by M. Pasteur. He controverts M. Frémy's results.—Influence of age of a tree on the average time of opening of its buds, by M. De Candolle. In certain species (horse-chestnut, *e.g.*) age has no influence; whereas, in others (such as the vine), it acts sometimes by retarding, sometimes by accelerating, the epoch in question.—On the displacement of lines in the spectra of stars, produced by their motion in space, by Mr. Huggins.—Examination of the possible mechanical action of light; study of Mr. Crookes's radioscope, by M. Ledieu (continued). He describes the experiments made by M. Fizeau, at his suggestion, with polarised light (the results were negative), proposes new experiments, and applies his theory in explanation of some celestial phenomena.—On the formation of an international committee for scientific exploration of the American isthmus with a view to making a canal, by M. de Lesseps.—M. Cosson presented a small apparatus called a central inflammatory obturator (for cartridges.)—Report on several memoirs of M. Allard on transparence of flames and of the atmosphere, and the visibility of lighthouses with flashing lights.—On the relations between the theory of numbers and the integral calculus, by M. Lucas.—On the photographic images obtained at the focus of astronomical telescopes, by M. Angot.—On the law of Dulong and Petit, by M. Terreil. He interprets it purely with reference to the laws of chemistry. The specific heat of bodies doubles when they cease to be gaseous.—On the irrigations in the south of France, and particularly in the department of the Bouches-du-Rhône, by M. Barral.—On the duration of tactile sensation, by M. Lalanne. Suppose a flexible body which will not hurt the skin by motion in contact with it, to be rapidly moved round the arm or leg. Analogously to the impression of a luminous circle before the eye when an incandescent stick is whirled rapidly, a continuous sensation should at a certain speed be produced, like that from pressure of a bracelet or ring. This is never experienced with less than ten turns per second. The least duration of tactile sensation observed was $\frac{1}{24}$ to $\frac{1}{25}$ of a second. It varies with individuals, and in different parts of the body.—On the galls of leaves of French vines, &c., by M. Boiteau.—Notes on history of Phylloxera, especially the species *Phylloxera Acanthokermes*, Kollar, by M. Lichtenstein.—Memoir on the perturbing influence of neighbouring masses, on the form and disposition of crystals, by M. Brame.—On linear equations of the second order, by M. Pepin.—On the development in series of the functions Al(x), by M. Foubert.—On the number of points of contact of algebraic or transcendent curves of a system with an algebraic curve, by M. Fouret.—Improvement in Watts's indicator, by M. Mallet.—On the inconveniences arising from use of a cable of copper wire as conductor of a lightning-rod, by M. Francisque Michel. Such wires under electric action show, ere long, a series of fractures, which lessen considerably the conducting section.—On the influence of certain salts and of lime on saccharimetric observations, by M. Müntz.—On a derivative of acetylacetic ether, oxypyrotartaric acid, by M. Demarçay.—Combustion of organic matters under the double influence of heat and of a current of oxygen, by M. Loiseau.—Metallisation of organic substances, fitting them to receive galvanic deposits, by M. Cazeneuve.—Action of digitalis compared with that of biliary salts on the pulse, arterial tension, respiration, and temperature, by MM. Feltz and Ritter.—On the vascular apparatus of Trematoda, by M. Villot.

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